

# MANUAL CHANGES

## MANUAL DESCRIPTION

CHANGE DATE: April 21, 1980

INSTRUMENT: 5061A Cesium Beam Frequency  
Standard Operating and Service Manual  
SERIAL PREFIX: 1740A  
DATE PRINTED: JUN 1978  
HP PART NO: 05061-9052  
MICROFICHE NO: 05061-9053

(This change supersedes all earlier dated changes)

- Make all changes listed as ERRATA.
- Check the following table for your instrument's serial prefix or serial number and make listed change(s) to manual.

IF YOUR INSTRUMENT HAS SERIAL PREFIX OR SERIAL NUMBER	MAKE THE FOLLOWING CHANGES TO YOUR MANUAL	IF YOUR INSTRUMENT HAS SERIAL PREFIX OR SERIAL NUMBER	MAKE THE FOLLOWING CHANGES TO YOUR MANUAL
1816A	1	1908A	1,2,3,4, 5,6,7,8
1840A	1,2	A5 Series 1916	3, thru 7
A5 Series 1840	3	1936A	1 thru 10
A2 Series 1848	4	1940A	1 thru 11
1852A	1,2,3,4,5	1948A	1 thru 12
1904A	1,2,3,4,5,6	2002A	1 thru 13
A5 Series 1904	3,7		

## ■ NEW OR REVISED ITEM

The following Service Notes are available from your local HP Sales and Service Office.

Service Note No.	Description
5061A-1	Improve Decade Divider IC4 in Synthesizer A1
5061A-2	Preferred Replacement Parts that Increase Reliability
5061A-3	Cesium Oven Controller Circuit Modification
5061A-4	Increasing Reliability and Tunability of Harmonic Generator Assembly (A4)
5061A-6	Installation of Hot Wire Ionizer Current Limit Resistors
5061A-7	Summary of Important Circuit Changes, Procedures and Replacement Parts
5061A-8	Modification for Improved Short Term Stability

## ERRATA

Page 8-5, Figure 8-5, Wiring Diagram:

Add "(Serial Prefix 1816A)" to caption.

Page 8-35, Figure 8-20, A9 Schematic Diagram:

Change SERIES numbers for A9 and A9A1 to 1816.

Page 8-55, Figure 8-30, A17 Schematic Diagram:

Add "(SERIES 1740)" to A17 description on bottom edge of diagram.

**NOTE — THE FOLLOWING ERRATA APPLIES ONLY TO INSTRUMENTS WITH SERIAL PREFIX NUMBER 1740A.**

Page 8-5, Figure 8-5, Wiring Diagram:

Replace with attached Figure 1 Signal Wiring Diagram (Serial Prefix 1740A).

Page 8-35, Figure 8-20, A9 Schematic Diagram:

Replace with attached Figure 2. A9 (05061-6134 SERIES 1740) Schematic Diagram.

Page 8-55, Figure 8-30, A17 Schematic Diagram:

Change output from terminal 4 to "TO S2B (4, 6, 11, 12) MODE".

Change output from terminal 22 to "TO S2B (2, 3) MODE".

**ERRATA (Continued)**

Page 6-28, Table 6-1, Replaceable Parts:

Change HP and Mfr Part Number for KIT:RACK MOUNT from 5060-0777 to 5060-8742.

Page 6-18, Table 6-1, A11 Replaceable Parts:

Change A11A1R33 and R34 to 0811-3288; R: FXD WW 0.025Ω 10% 2W; 28480; 0811-3288.

Page 8-45, Figure 8-25, A11 (05061-6009) Schematic Diagram:

Change values of A11A1R33 and R34 to 0.025 ohms.

Title Page (inside front cover):

Change paragraph under "SERIAL PREFIX: 1740A" to the following:

This manual applies directly to HP Model 5061A Cesium Beam Frequency Standards having Serial Prefix 1740A.

Page 3-7, NOTE following paragraph 3-14.c:

Change second sentence to: "Thus, when the instrument is initially turned on, the battery will charge for 13 to 18 hours and the BATTERY light will be on during the charge cycle."

Page 5-40, Paragraph 5-234, fifth line:

Change "A15R30 and A15R31" to A15R33 and A15R34.

Page 5-40, Paragraph 5-236, second and third lines:

Change "P±50V)" to "(=50V)".

Change "A15R30 and A15R31" to A15R33 and A15R34.

Page 5-40, Paragraph 5-239:

Change to the following:

If assembly A19 is replaced, resistors A15R33 and A15R34 on Power Regulator Assembly A15 must be changed. Refer to paragraph "5-186. ELECTRON MULTIPLIER VOLTAGE ADJUST (A15R33, A15R34)." for procedure.

Page 5-41, Paragraph 2-254, second line:

Change sixth word to "operating".

Page 5-43, Paragraph 5-260, step c:

Change "18 to 21" to "13 to 18".

Page 5-43, Paragraph 5-260, step d:

Change "bread" to "lead".

Page 5-43, Paragraph 5-262:

Complete second sentence to read as follows: "To isolate the the trouble circuit, perform following checks in order given: 1) Timing Oscillator (Paragraph 5-268), 2) Decades (Paragraph 5-271), 3) Reset Preset (Paragraph 5-267) and 4) Logic Comparator (Paragraph 5-269)."

Page 6-33, Table 6-3, Option 001 Miscellaneous Replaceable Parts:

Change 05061-6061 to W26; 05061-6104; CABLE ASSY: FREQUENCY DIVIDER; 28480; 05061-6104.

Add in "Reference Designation" column.

W27 for 05061-6062 cable assembly.

W31 for 05061-6068 cable assembly.

W32 for 05061-6069 cable assembly.

Page 8-11, Figure 8-9, A1 Schematic Diagram:

Reference designators for C31, C32; CR36, CR37; and R72, R73 are transposed.

Change C31 to C32 and C32 to C31.

Change CR36 to CR37 and CR37 to CR36.

Change R72 to R73 and R73 to R72.

Delete A1C39 capacitor (2500 pF) in the drain circuit of FET Q3.

Page 8-53, Figure 8-29, A16A1 Schematic Diagram:

Add "CR4" label to diode between U2 and C10 in A16A1 component locator illustration.

Change A16A1 schematic diagram by transposing A16R14 and A14C12. Capacitor C12 connects between U2(9) and one end of R14. The other end of R14 goes to circuit board common.

Remove connection between A16A1Q3 collector and A16A1U2 pins 11 and 14. Add connection between circuit board common and A16A1U2 pins 11 and 14.

Page 6-33, Table 6-3, Option 001 Replaceable Parts:

Add A5; 05061-6118; MODULE ASSY: DIGITAL DIVIDER.

Page 6-30, Table 6-2, Option 002 Replaceable Parts:

Change "Description" for BT1 to BATTERY 24V 2.2A-HR NI-CD WITH FLEX LEADS; 28480; 1420-0053.

Page 8-19, Figure 8-13, A5 BLOCK DIAGRAM:

Change A5 DIGITAL DIVIDER ASSY part number (top of diagram) from 05061-6011 to 05061-6118.

Change A5A1 POWER SUPPLY part number from 05061-6015 to 05061-6114.



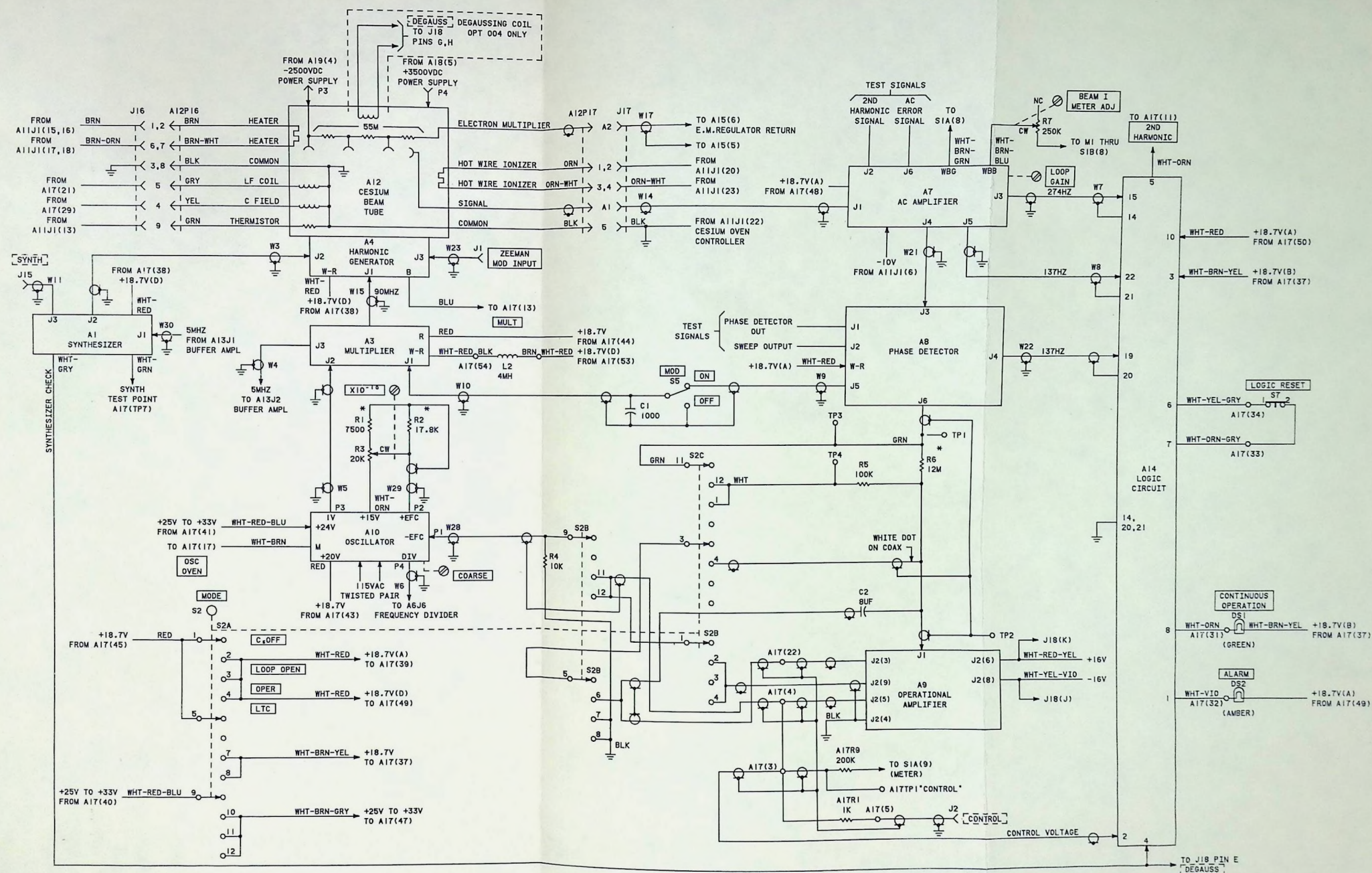


Figure 1. Signal Wiring Diagram (Serial Prefix 1740A)



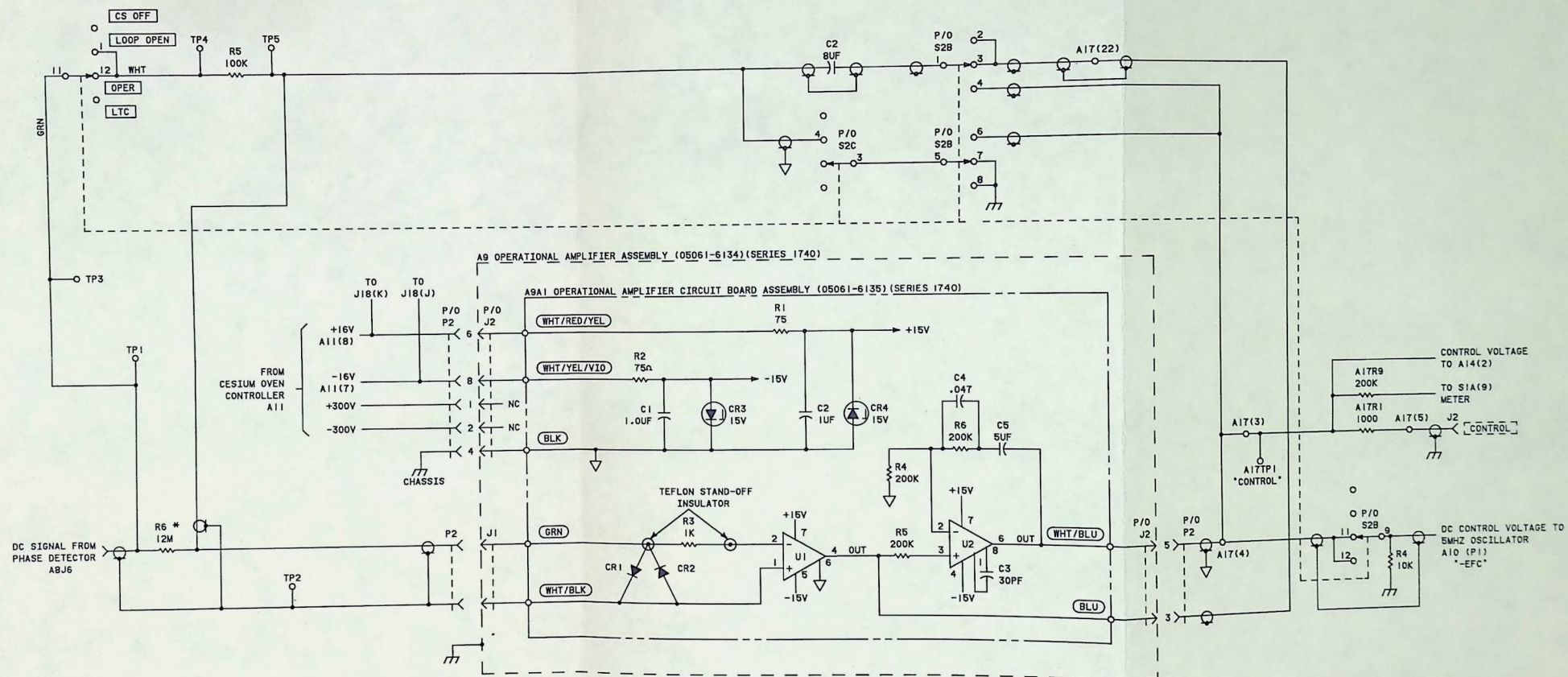


Figure 2. A9 (05061-6134 Series 1740) Operational Amplifier Schematic Diagram



**ERRATA (Continued)**

Page 8-21, Figure 8-14, Part of A5 Schematic Diagram;

Page 8-23, Figure 8-15, Part of A5 Schematic Diagram; and

Page 8-25, Figure 8-16, Part of A5 Schematic Diagram:

Change A5 part number shown on top of diagrams from 05061-6011 to 05061-6118.

Page 6-23, Table 6-1, A17 (05061-6018) Replaceable Parts:

Change A17R2\* to 0757-0962; R: FXD FLM 39K 2% .125W; 28480; 0757-0962.

Change A17R3\* to 0757-0959; R: FXD FLM 30K 2% .125W; 28480; 0757-0959.

Change A17R4\* to 0757-0972; R: FXD FLM 100K 2% .125W; 28480; 0757-0972.

Change A17R7\* to 0698-3457; R: FXD FLM 316K 1% .125W; 28480; 0698-3457.

Page 8-55, Figure 8-30, A17 Schematic Diagram:

Change R2\* to 39K.

Change R3\* to 30K.

Change R4\* and R9\* to 100K.

Change R7\* to 316K.

Page 5-10, Table 5-3, Assembly Designations:

Change A16 part number 05061-60125 to 05061-6125 and part number 05061-60136 to 05061-6136.

Page 5-27, Paragraph 159, Cesium Tube 05061-6077 Specifications:

Change Peak beam current to equal  $0.8 \times 10^{-8}A$ .

Page 5-29, Paragraph 5-70:

Delete first three sentences (approximately 8 2/3 lines).

Page 5-30, Paragraph 5-171b, third line:

Add "dc" between "impedance" and "voltmeter".

Page 5-30, Paragraph 5-171k:

Change power of 10 in formula from "10<sup>13</sup>" to "10<sup>-13</sup>".

Page 6-17, Table 6-1, A11 Replaceable Parts:

Change A11Q5 and Q6 from 1854-0613 to 05061-8013 in HP Part Number column.

Page 6-30 thru 6-32, Table 6-2, Option 002 Replaceable Parts:

Add "(SERIES 1736)" to Description for A2.

Add an asterisk (\*) beside A2R2 and A2R64 reference designations.

Change "Mfr Part Number" for A2C7 to 150D107X903052.

Page 8-13, Figure 8-10, A2 Schematic Diagram:

Change A2 series number, at top of diagram to 1736.

Add an asterisk (\*) beside A2R2 and A2R64 reference designators.

Page 7-1, Table 7-1, *Manual Backdating*:

Change second entry in left-hand column to the following:

"1724A (-01387 and below except -01378, -01379, or -01384) with series 1736 circuit board for A2 in Option 002 or 003."

Page 7-2, **CHANGE 2:**

Change **CHANGE 2** to the following:

Page 6-30, Table 6-2, Option 002 Replaceable Parts:

Change A2 series number from 1736 to 1512A.

Change A2CR5 from 1902-0041 to 1902-0579.

Page 8-13, Figure 8-10:

Change Series No. (at top of diagram) from 1736 to 1512A.

Delete asterisk (\*) beside R2 and R64.

Page 2-2, Paragraph 2-14, Second sentence:

Change sentence to read "Parts necessary to convert the instrument for rack mounting are available as a kit."

Page 8-55, Figure 8-30, A17 Wiring Diagram:

Change A17 terminal 37 connection to MODE switch "from S2B(7,8)" to "from S2A(7,8)".

Page 1-3, Table 1-1, Specifications:

Change POWER: to 115V  $\pm 10\%$ , 48-440 Hz; 230V  $\pm 10\%$ , 48-66 Hz; or 22 to 30V dc.

Page 8-11, Figure 8-9, A1 Schematic Diagram:

Change A1 part number from 05061-6087 to 05061-6097 and A1A1 from 05061-6088 to 05061-6098.

Page 5-13, Figure 5-6, Synthesizer Operational Check Setup:

Change model number of HP counter to 5345A.



**ERRATA (Continued)**

Page 5-33, Paragraph 5-188, Harmonic Generator Adjustment:

Delete adjustment steps "h." through "u." and replace with the following steps "h." through "s.".

- h. Push A4 attenuator halfway in and lock in place.
- i. Adjust A4R1 completely ccw, then carefully cw for a peak indication on the dc voltmeter. When a peak indication is attained, carefully readjust A4R1 ccw for a dc voltmeter indication which is halfway between the peak and background levels to ensure that the beam tube is not saturated. In the following steps do not let the peak current exceed 3/4 of the peak current obtained in this step. If it does, adjust A4R1 ccw until the reading is halfway between peak and background.
- j. Adjust A4 cavity tuning control (see Figure 5-11) for a peak indication on the dc voltmeter. Tighten the cavity Tuning Control Lock. If in step d., the oscillator frequency was adjusted to  $\pm 0.1$  Hz of 5 MHz, do the first part of step d.
- k. Keep locknut snug and adjust A4S5 for a peak indication on the dc voltmeter. Be sure beam current indication never exceeds 75% of the peak value noted in step i. If it does, adjust A4R1 ccw until current is halfway between peak and background.
- l. Repeat steps 11 and 12 until no further beam current increase is attained by adjusting A4S5. When making the final adjustment, tighten the locknut while adjusting A4S5, so that the peak indication is obtained when the locknut is tight (do not overtighten).
- m. Loosen attenuator and push full in (maximum attenuation).
- n. Adjust A4R1 full ccw, and then cw to the first peak indication on the dc voltmeter.
- o. Pull A4 attenuator out until dc voltmeter peaks then decreases slightly, about 1 minor division of the voltmeter (this is the optimum beam current). Carefully lock attenuator set-screw.

**CAUTION**

**In Step o, the beam current may decrease as the attenuator is pulled out.  
Should this occur, lock the attenuator all the way in, and adjust A4R1.**

- p. Turn A4R1 maximum ccw, then cw until the dc voltmeter indicates a peak (see Figure 5-10a).
- q. Continue turning A4R1 cw. The dc voltmeter indication will remain the same, or decrease, then increase again to the peak level of step o. This double peaking indicates saturation.

**NOTE**

If the "saturated" double peak is not evident in steps p and q, pull A4 attenuator out slightly and repeat steps p and q (see Figure 5-10a). If saturation cannot be attained with the attenuator pulled out all the way, realign A4 Harmonic Generator as described previously.

- r. If A4R1 is turned further cw, the dc voltmeter indication will decrease, then increase to a peak of lower amplitude than in step o.
- s. The correct peak is the first one encountered as R1 is turned cw from its maximum ccw position. Reset A4R1 by turning it full ccw and then cw to the first peak. This completes Harmonic Generator A4 alignment.

Page 8-63, Beam I:Low, Troubleshooting:

Change steps "35/45" to read as follows:

"Remove A4P2. Check voltage at A4P2; should be  $>0.2V$  rms.

Page 8-3, Figure 8-2, Block Diagram:

Add test location number for waveforms at the following points:

- |   |   |    |        |                                   |
|---|---|----|--------|-----------------------------------|
| 1 | at A10J3.                               | 8  | and 15 | on line from A12J17(P1) and A7J1. |
| 2 | at A10J4 (DIV).                         | 9  |        | on DC ERROR line at A8J6.         |
| 3 | on line between A13J2 and A3J3.         | 10 | and 11 | at A8J1 TEST.                     |
| 4 | on line between A13J1 and A1J1.         | 12 |        | at A7J2 2N HARMONIC TEST.         |
| 5 | on line between A1J3 and J15 SYNTH.     | 13 |        | at A8J4 137 Hz.                   |
| 6 | on line between A11J1(15-18) and A12.   | 14 |        | on line between S3 ON and A8J5.   |
| 7 | on OVEN POWER line between A11 and A12. |    |        |                                   |

Delete reference to "Synthesizer time scale 0366." under waveform number 5.

# **ERRATA (Cont'd)**

Page 8-9, Figure 8-7, A1 Component Locator:

Transpose the reference designators for R59 and R60. R60 is adjacent to C24 and R59 is adjacent to CR31.

Page 8-57, Figure 8-31, A15 and A18 Circuit Diagrams:

Change A15Q15 to 1854-0062.

Change A15R23 from 3300 to 33K ohms.

Change A18Q2 to 1854-0062.

Page 6-33, Table 6-3, Option 001 Replaceable MISCELLANEOUS Parts:

Change 05061-6034 to 05061-6100 in "HP" and "Mfr Part Number" columns.

Page 8-53, Figure 8-29, A16A1 Component Locator:

Add C5 over unidentified capacitor between upper end of U1 and C8.

Add C6 over unidentified capacitor between lower end of U1 and C8.

- Page 3-4, Figure 3-3, Rear-Panel Controls:

Change "SYNC" in item "6." to SYNTH.

- Page 5-10, Paragraph 5-7:

Add attached page 5-10a Performance Check Test Card.

- Page 6-6, Table 6-1, A3A1 Replaceable Parts:

Change HP Part Number for A3A1C33 and C36 to 0160-2225.

- Page 8-4, Figure 8-3, Front-Panel View:

Change switch marked "S3" in front-panel view to S5.

- Page 8-13, Figure 8-10, A2 Component Locator:

Change component locator to show an alternate location for C16. This capacitor appears at the lower end of IC7 between R59 and CR32. The alternate position is between CR29 and R36.

- Page 8-15, Figure 8-11, A3 Component Locator:

Add R38 callout for resistor located between C28 and Q5.

Add R39 callout for resistor located between C42 and L13.

- Page 8-23, Figure 8-15, A5A2 Component Locator:

Change resistor designated R43 (midway between IC4 and IC5) to R42.

Change resistor designated R42 (adjacent to IC10) to R43.

- Page 8-27, Figure 8-17, A6 Component Locator:

Change "C14" located between CR4 and R16, near T2, to C13.

Change "R47" located between C36 and R39, near Q11, to R41.

- Page 8-49, Figure 8-27, A14 Component Locator:

Change "R36" located between CR6 and R33, near Q10, to R38.

- Page 8-51, Figure 8-28, A15 Schematic Diagram:

Change R28 to 10K and R32 to 4700 ohms.

- Page 8-53, Figure 8-29, A16 Schematic Diagram:

Add "10" by U2 pin labeled "SHUT" in A16A1 diagram.

Add a connection between Q1 through Q7 emitters in U2 and U2 pin 15 shown in A16A2 diagram.







#### CHANGE 1 (1816A)

Page 6-13, Table 6-1, A9 Replaceable Parts:

Add "(SERIES 1816)" to Description of Module A9 and circuit board assembly A9A1.

**NOTE:** The Wiring Diagram (Page 8-5, Figure 8-5), A9 Schematic Diagram (Page 8-5, Figure 8-20), and A17 Schematic Diagram (Page 8-55, Figure 8-30) apply to instruments with Serial Prefix Number 1816A or higher.

Page 6-24, Table 6-1, CHASSIS & MISCELLANEOUS Replaceable Parts:

Change F1, F2, and F3 fuseholders (1400-0084) to the following:

2110-0564; FUSEHOLDER BODY; 28480; 2110-0564.

2110-0565; FUSEHOLDER CAP; 28480; 2110-0565.

2110-0569; FUSEHOLDER MTG NUT-PLASTIC, HEX: 28480; 2110-0569.

#### CHANGE 2 (1840A) (STANDARD INSTRUMENT)

See NOTE at end of CHANGE 10.

Page 6-23, Table 6-1, A19 Power Supply:

Add (SERIES 1840) to "Description" for A19 (05060-6092).

Page 8-57, Figure 8-31, A19 (05060-6092) Schematic Diagram:

Change series number at top of A19 schematic from "1240A" to 1840.

Change minimum output voltage range at A19 pin 4 from "-1800V" to "-1250V".

Instrument serial prefix number changes from 1816A to 1840A with this change for A19.

#### CHANGE 3 (A5 SERIES 1840) (OPTIONS 001 or 003)

**NOTE:** The following change for A5 series number does not affect the serial prefix number of the instrument in which A5 is installed. Module assembly A5 is added for Option 001 or 003. Consequently, the A5 series number may not be the same as the instrument serial prefix number.

Page 6-33, Table 6-3, Option 001 Replaceable Parts:

Add "(SERIES 1840)" to Description of A5 (05061-6118) Digital Divider Module.

Page 6-35, Table 6-3, Option 001 Replaceable Parts:

Add "(SERIES 1840)" to Description of A5A2 (05061-6014) circuit board assembly.

Change A5A2C13 from 0140-0202 (15 PF) to 0160-2197; C: FXD MICA 10 PF 5% 300VDCW; 28480; 0160-2197.

Page 8-21, Figure 8-13, A5 Block Diagram:

Change A5 series number to SERIES 1840.

Page 8-21, Figure 8-14, Part of A5 Schematic Diagram;

Page 8-23, Figure 8-15, Part of A5 Schematic Diagram; and

Page 8-25, Figure 8-16, Part of A5 Schematic Diagram:

Change A5 series number at top of diagrams to SERIES 1840.

Page 8-23, Figure 8-15, A5A2 (05061-6014) Schematic Diagram:

Add SERIES 1840 at top of A5A2 schematic diagram.

Change value of A5A2C13 from 15 to 10 pF.

#### CHANGE 4 (A2 SERIES 1848) (OPTIONS 002 or 003)

**NOTE:** The following change for A2 series number does not affect the serial prefix number of the instrument in which A2 is installed. Circuit board assembly A2 is added for Option 002 or 003. Series 1848 circuit boards for A2 will not be the same as the instrument serial prefix number.

Page 6-30, Table 6-2, Option 002 Replaceable Parts:

Change A2 series number from 1736 to 1848.

Change A2C5 and A2C7 from 0180-2614 to 0180-0113 under "HP Part Number" and "Mfr Part Number" from 150D107X903052 to 109D107C2030T2.

Page 8-13, Figure 8-10, A2 (05061-6019) Schematic Diagram:

Change A2 series number (top of diagram) from 1736 to 1848.

#### CHANGE 5 (1852A) (STANDARD INSTRUMENT)

See NOTE at end of CHANGE 10.

Page 6-5, Table 6-1, A3 Replaceable Parts:

Add "(SERIES 1852)" to Description of A3 (05061-6108).

Add "(SERIES 1852)" to Description of A3A1 (05061-6106).

Change A3A1C12 from 0160-0937 (1000 pF) to 0160-0573; C: FXD CER 4700 pF  $\pm$  20% 100 VDCW; 28480; 0160-0573.

Add A3A1C54; 0160-2055; C: FXD CER 0.01  $\mu$ F +80-20% 100VDCW; 28480; 0160-2055.

Add A3A1R40; 0757-0924; R: FXD FLM 1K OHM 2% 0.125W TC= 0 $\pm$ 100; 24546; C4-1/8-TO-911-G.



**CHANGE 5 (1852A) (STANDARD INSTRUMENT) (Continued)**

Page 8-15, Figure 8-11, A3 Schematic Diagram:

Change "(SERIES 1640A)" at top of A3 and A3A1 schematics to (SERIES 1852).

Add 0.01  $\mu$ F capacitor (C54) in parallel with electrolytic capacitor C10.

Add 1000 ohm resistor (R40) in series between the arm of R20 and the junction of L2 and C12.

Change the value of C12 from 1000 pF to 0.0047  $\mu$ F.

**CHANGE 6 (1904A) (STANDARD INSTRUMENT)**

See NOTE at end of CHANGE 10.

Page 6-12, Table 6-1, A8 Replaceable Parts:

Add "(SERIES 1904)" to A8 (05061-6095) Description.

Add "(SERIES 1904)" to A8A1 (05061-6096) Description.

Change "HP Part Number" for A8A1C9, C10, and C22 from 0180-0113 to 0180-2614.

Change "Mfr Part Number" for A8A1C9, C10, and C22 from 109D107C2030T2 to 150D107X903052.

Page 8-33, Figure 8-19, A8 Schematic Diagram:

Change "SERIES 1244A" at top of A8 schematic to "SERIES 1904".

Add SERIES 1904 at top of A8A1 schematic.

Page 6-24, Table 6-1, Replaceable Chassis Parts:

Change C5 from 0180-0090 (1000  $\mu$ F) to 0180-2877; C: FXD ELEC 2400  $\mu$ F +75-10% 50VDCW; 28480; 0180-2877.

Page 8-51, Figure 8-23, Schematic Diagram:

Change C5 from 1000 to 2400  $\mu$ F.

**CHANGE 7 (A5 SERIES 1904) (OPTIONS 001 or 003)**

NOTE: The following change for A5 series number does not affect the serial prefix number of the instrument with A5 added for Option 001 or 003. The series number on the A5 module assembly may not be the same as the instrument serial prefix number.

Page 6-33, Table 6-3, Option 001 (A5) Replaceable Parts:

Change A5 (05061-6118) series number from 1840 to 1904.

Page 6-37, Table 6-3, Option 001 (A5A4) Replaceable Parts:

Change A5A4 (05061-6033) and all components for this assembly with A5A4 Part No. 05061-6152 and components in attached Table 1.

Table 1. A5A4 Part No. 05061-6152 Replaceable Parts

REFERENCE DESIGNATION	HP PART NUMBER	DESCRIPTION
A5A4	05061-6152	ASSY: SWITCH CIRCUIT BOARD (SERIES 1904)
A5A4C1*	0140-0196	C: FXD MICA 150 pF 5% 300VDCW
A5A4IC1	1820-1437	IC: TTL DUAL MONOSTABLE MVB/SCHMITT-TRIGR
A5A4Q1	1854-0005	TSTR: NPN SI 2N708
A5A4R1	0757-0280	R: FXD FLM 1K OHM 1% 1/8W
A5A4R2	0757-0283	R: FXD FLM 2K OHM 1% 1/8W
A5A4R3	0757-0442	R: FXD FLM 10K OHM 1% 1/8W
A5A4R4	2100-0896	R: VAR WW 15K OHM 1-TURN TOP-ADJ

Page 8-19, Figure 8-13, A5 Schematic Diagram:

Change A5 from SERIES 1840 to SERIES 1904.

Replace A5A4 schematic diagram with diagram in attached Figure 3 for A5A4 Part No. 05061-6152 (SERIES 1904) circuit board assembly.

Replace A5A4 component locator illustration with new illustration in attached Figure 4.

Page 8-21, Figure 8-14, Part of A5 Schematic Diagram;

Page 8-23, Figure 8-15, Part of A5 Schematic Diagram; and

Page 8-25, Figure 8-16, Part of A5 Schematic Diagram:

Change A5 series number at top of diagrams from SERIES 1840 to 1904.

NOTE — The new A5A4 circuit board assembly uses a potentiometer for adjustment in place of a variable capacitor. The adjustment procedure given in the Operating and Service Manual for A5A4 is the same for either assembly.



## PERFORMANCE CHECK TEST CARD

HEWLETT-PACKARD MODEL 5061A  
CESIUM BEAM FREQUENCY STANDARD

Tests Performed By \_\_\_\_\_

Serial No. \_\_\_\_\_

Option(s) \_\_\_\_\_ Date \_\_\_\_\_

## OPERATIONAL CHECKS

Description	Check
1. CIRCUIT CHECK Meter	_____ See Table 3-3
2. Output Frequencies	_____ $\pm 1$ Count (Counter Error)
3. Output Voltages	_____ 1 to 1.5V rms
4. Output Waveforms	_____ Clean Sine waves

## PERFORMANCE CHECKS

Description	Check
1. Harmonic Distortion; greater than 40 dB from rated output	_____ greater than 40 dB
2. Non-Harmonic Distortion; greater than 80 dB from rated output	_____ greater than 80 dB
3. Accuracy; Standard Tube $\pm 1 \times 10^{-11}$ Option 004 $7 \times 10^{-12}$	_____ $\pm 1 \times 10^{-11}$ Option 004 $7 \times 10^{-12}$
4. Clock Pulse (Option 001 or 003)	_____ Rate: 1 PPS Amplitude: 10V p-p $\pm 10\%$ Width: 20 $\mu$ s minimum Rise Time: less than 50 ns Fall Time: less than 2 $\mu$ s Jitter: less than 5 ns Time Delay: 1 $\mu$ s to 1 s
5. Clock Pulse Synchronization (Option 001 or 003) and delay	_____
6. Standby Power Capacity (Option 002 or 003) for 30 minutes	_____ 30 minutes minimum
7. Frequency Stability of 5 MHz Output (Sigma $\gamma$ of Tau)	_____ $2.5 \times 10^{-11}$ (standard tube for 10 seconds averaging time). $2.7 \times 10^{-12}$ (Option 004 for 10 seconds averaging time).







Figure 4. A5A4 Component Locator Part No. 05061-6152 (SERIES 1904)







# **CHANGE 8 (1908A) (STANDARD INSTRUMENT)**

See NOTE at end of CHANGE 10.

Pages 6-3 and 6-4, Table 6-2, Replaceable Parts:

Change A1 Module 05061-6097 and A1A1 (05061-6098) series numbers from 1724 to 1908.  
Change A1A1Q18 from 1854-0035 to 1854-0547; TRANSISTOR NPN SI T0-5 PD=800MW; 01295; 2N3725.

Page 8-9, Figure 8-8, Schematic Diagram:

Change A1 and A1A1 series number from 1724A to 1908.

Page 8-11, Figure 8-9, Schematic Diagram:

Change A1 and A1A1 series number from 1724A to 1908.  
Change A1A1Q18 from 1854-0035 to 2N3725.

Page 6-23, Table 6-1, Replaceable Parts:

Add (SERIES 1908) to Description for A18 (05060-6093).  
Change A18Q1 from 1854-0035 to 1854-0547; TRANSISTOR NPN SI T0-5 PD=800MW; 01295; 2N3725.  
Change A19 series number from 1840 to 1908.  
Change A19Q1 from 1854-0035 to 1854-0547; TRANSISTOR NPN SI T0-5 PD=800MW; 01295; 2N3725.

Page 8-57, Figure 8-31, A18 and A19 Schematic Diagrams:

Change A18 series number from 1236A to 1908.  
Change A18Q1 from 1854-0035 to 2N3725.  
Change A19 series number from 1840 to 1908.  
Change A19Q1 from 1854-0035 to 2N3725.

# **CHANGE 9 (Option 001 SERIES 1916)**

**NOTE** — The following change for module A5 series number does not affect the serial prefix number of the instrument in which A5 is installed. Module assembly A5 is added only when Option 001 or 003 is added. Consequently, the series number for A5 may not be the same as the instrument serial prefix number.

Pages 6-3 and 6-4, Table 6-3, Option 001 Replaceable Parts:

Change A5 and A5A15 from series 1532A to 1916.  
Change A5A1Q8 from 1854-0035 to 1854-0547, TRANSISTOR NPN SI T0-5 PD=800MW; 01295; 2N3725.

Page 8-21, Figure 8-14, A5 Schematic Diagram:

Change A5 series number from 1904 to 1916.  
Change A5A1 series number from 1532A to 1916.  
Change A5A1Q8 from 1854-0035 to 2N3725.

# **CHANGE 10 (1936A)**

Page 6-13, Table 6-1, A9 Replaceable Parts:

Change A9 and A9A1 series numbers from 1816 to 1936.  
Delete HP Part No. 0160-0138 for A9A1C4 and change Description to NOT ASSIGNED.  
Delete HP Part No. 0757-0472 for A9A1R5 and R6. Change Description for both resistors to NOT ASSIGNED.  
Change A9A1R4 from 0757-0472 (200K $\Omega$ ) to 0699-0088; RESISTOR-FXD 1.21M $\Omega$  1% .125W FLM; 28480; 0699-0088.  
Change A9A1U2 from 1826-0059 (LM201AH) to 1826-0471; OP-AMP LOW-DRIFT T0-99; 06665; 0P07CJ.

Page 8-35, Figure 8-20, A9 Schematic Diagram:

Change A9 and A9A1 series numbers to 1936.  
Delete capacitor A9A1C4.  
Change A9A1R4 from 200K to 1.21M $\Omega$ .  
Delete resistors A9A1R5 and R6 and replace each resistor with a wire jumper.

Page 6-10, Table 6-1, A7 (05061-6005) and A7A1 (05061-6006) Replaceable Parts:

Add SERIES 1936 to Description of A7 and A7A1.  
Add A7A1C24 and C25; 0180-0228; CAPACITOR-FXD 22 UF 10% 15VDC TA;56289; 150D226X9015B2.



**CHANGE 10 (1936A) (Continued)**

Page 8-31, Figure 8-18, A7 Schematic Diagram:

Change A7 from "SERIES 1244A" to SERIES 1936.

Add SERIES 1936 at top edge of A7A1 circuit board.

Add 22UF capacitor C24 in parallel with diode CR3. Connect negative side of C24 to CR3 anode.

Add 22UF capacitor C25 in parallel with diode CR4. Connect negative side of C25 to CR4 anode.

**NOTE** — The following instruments have SERIES 1936 assemblies for A7 and A9:

1840A01490	1852A01516	1908A01550
1840A01493	1904A01524	1908A01551
1840A01494	1904A01525	1908A01552
1840A01499	1908A01528	1908A01555
1852A01510	1908A01531	1908A01556
1852A01513	1908A01532	1908A01557
1852A01514	1908A01533	1908A01558
		1908A01559

**CHANGE 11 (1940A) STANDARD INSTRUMENT**

Page 3-2, Figure 3-1, Front Panel Controls:

Change frequency resolution for item "10. C-FIELD control:" from  $5 \times 10^{-14}$ /minor division to  $8 \times 10^{-14}$ /minor division.

■ Page 3-4, Figure 3-3, Rear-Panel Controls:

Change synthesizer output frequency in "6." to 12,631,772.5 Hz.

Page 3-7, Paragraph k., C-Field Adjustment:

Change Audio Oscillator frequency in step k.(5) from 42.82 kHz  $\pm 50$  Hz to 53.53 kHz  $\pm 50$  Hz.

Page 3-8, Paragraph 3-14, Step k continued:

Change audio oscillator output in Figure 3-5 to 53.53 kHz.

Change second paragraph of NOTE (below step k.(7)) to read as follows:

When correctly set, the C-FIELD dial will read between 4.0 and 6.0 (applies only to instruments with Serial Number 1220A00561 or higher). C-FIELD dial resolution for instrument with difference serial numbers is given in the following table:

SERIAL NUMBER	C-FIELD DIAL RESOLUTION
1132A00560 or below	$1 \times 10^{-12}$ per minor division
1220A00561 thru 1926A01583	$5 \times 10^{-14}$ per minor division
1940A01584 or higher	$8 \times 10^{-14}$ per minor division

Change 42.82 kHz in paragraph (9) (b) to 53.53 kHz.

Page 3-11, Table 3-4, 5061A Operating Record:

Change ZEEMAN FREQUENCY to 53.53 kHz.

Page 4-1, Paragraph 4-4, Third Sentence:

Change 9,192,631,771.6 Hz to 9,192,631, 772.5 Hz.

Page 4-1, Table 4-1, Assembly Designations:

Change A1 Synthesizer to HP Part No. 05061-6158.

Page 4-2, Paragraph 4-23:

Change 12.6317716 in lines 2 and 6 to 12,631,772.5 Hz.

Change 771.6 in line 4 to 772.5 Hz.

Page 4-3, Paragraph 4-27, Last Sentence:

Change last sentence to read as follows: "To the synthesizer M=10305 and N=4079 giving an output frequency of 12,631,772.5 Hz."

Page 4-4, Paragraph 4-34:

Change paragraph to read as follows:

4-34. The jumper wires program the inputs to preset decade IC1, IC2, IC5, and IC6. For example, IC1 input is programmed for a BCD of 1, IC1(4) is HI and IC1(3, 10, 11) are LO. IC1 requires positive logic levels at its preset inputs. Therefore, the HI level at pin 4 represents the BCD 1.

Page 4-4, Figure 4-4, A1 Timing Diagram:

Change "PRESET NUMBER" from 8634 to 5921.

Change numbers "8635", "8636", "8773", and "9988" to 5922, 5923, 5924, and 5925 (respectively).

**CHANGE 11 (1940A) STANDARD INSTRUMENT (Continued)**

Page 4-4, Paragraph 4-37, Second Line:

Change 12,631,771.6 MHz in line 2 to 12,631,772.5 Hz.

Page 4-20, Paragraph 4-211, Fourth Line:

Change 61 to 76 milligauss.

Page 5-10, Table 5-3, Assembly Designations:

Change HP Part No. for A1 from 05061-6097 to 05061-6158 (SERIES 1940).

Page 5-13, Paragraph 5-51, Third Line:

Change 12,681,771.6 to 12,631,772.5 Hz.

Page 5-13, Table 5-5, Synthesizer Output Period:

Change "8636" under "Digital Divider Hardwired for" to 5921.

Change "273.2  $\mu$ s" under "Signal Period at A1TP1" to 815.8  $\mu$ s.

Page 5-14, Table 5-6, Synthesizer Troubleshooting Chart:

Change "273.2  $\mu$ s" to 815.8  $\mu$ s for measured period at A1TP1.

Page 6-3, Table 6-1, Replaceable Parts for A1 Module:

Change A1 part number in HP and Mfr columns from 05061-6097 to 05061-6158.

Change A1 series number from 1908 to 1940.

Change A1 cover (A1 MISC PARTS) part number from 05061-0054 to 05061-0088 in HP and Mfr part number columns.

Change A1A1 Board Assembly series number from 1908 to 1940.

Page 6-5, Table 6-1, A1A1 Replaceable Parts:

Change A1A1R84 from 0757-0948 (10 K $\Omega$ ) to 0757-0939; R:FXD FLM 4.3K 2% .125W; 28480; 0757-0939. FACTORY SELECTED VALUE.

Pages 8-9 and 8-11, Figures 8-8 and 8-9, A1 Schematic Diagrams:

Change A1 part number in both diagrams from 05061-6097 to 05061-6158.

Change A1 Assembly and A1A1 circuit board series numbers from 1908 to 1940.

Change connections to Preset Decade IC1 (in Figure 8-8) by removing common ground connection to pin 4.

Add a common ground connection to IC1 pin 3.

Add a common ground connection to IC2 pin 4.

Remove common ground connections to IC5 pins 4 and 11.

Add common ground connections to IC5 pins 10 and 3.

Remove common ground connection to IC6 pins 4 and 3.

Add a common ground connection to IC6 pin 11.

**NOTE** — The above changes in connections to the Preset Decade Dividers changes the division number from 1366 to 4079 and the synthesizer output frequency from 12,631,771.6 Hz to 12,631,772.5 Hz.

Page 6-21, Table 6-1, A15 Replaceable Parts:

Change A15R21 from 0811-3260 (235 $\Omega$ ) to 0811-1016; R:FXD 185 OHM 1% 3W WIRE TC=0 $\pm$ 20 PPM/ $^{\circ}$  CELSIUS; 28480; 0811-1016. FACTORY SELECTED VALUE.

Page 8-51, Figure 8-28, A15 Schematic Diagram:

Change value of R21 in NOTE 4 from 235 to 185 ohms.

Change value of A15R21 in schematic diagram from 360 to 280 ohms.

**NOTE** — Resistors selected for use as A15R19 and A15R21 must have a low temperature coefficient of resistance.

Page 6-23, Table 6-1, A19 Power Supply:

Change A19 series number from 1908 to 1940.

Page 8-57, Figure 8-31, A19 (05060-6092) Schematic Diagram:

Change series number at top of A19 schematic from 1908 to 1940.

Change minimum output voltage range at A19 pin 4 from "-1250V" to "-1500V".

**CHANGE 12 (Serial Prefix 1948A)**

Page 4-1, Table 4-1, Assembly Designations:

Change listing for A10 to the following:

A10 Quartz Oscillator (Options 001, 002, or 003) HP Part No. 00105-6012.

A10 Quartz Oscillator (Option 004 only) HP Part No. 00105-6013.

Page 5-10, Table 5-3, Assembly Designations:

Change listing for A10 to the same given above for Table 4-1.



**CHANGE 12 (Serial Prefix 1948A) (Continued)**

Page 6-14A, Table 6-1, A10 Rebuilt Assembly:

Change "Description" to the following:

REBUILT OSCILLATOR ASSEMBLIES ARE AVAILABLE. ORDER HP PART NO. 00105-6033 FOR INSTRUMENTS LESS OPTIONS OR WITH OPTIONS 001, 002, OR 003. ORDER 00105-6034 FOR INSTRUMENTS WITH OPTION 004. COMPONENTS INSIDE A10 NOT RECOMMENDED FOR CUSTOMER FACILITY REPAIR.

Pages 8-37, 8-39, 8-41, and 8-43; Figures 8-21 thru 8-24; Schematic Diagrams:

Change HP part number at top of each diagram to the following:

(00105-6012 STANDARD INSTRUMENT WITH OR WITHOUT OPTIONS 001, 002, OR 003).  
(00105-6013 OPTION 004 ONLY)

**CHANGE 13 (Serial Prefix 2002A)**

Page 1-2, Table 1-1, Beam Tube Warranty Specifications:

Change "Beam Tube Warranty" for "Option 004 High Performance Beam Tube" to 12 months.

Page 1-3, Table 1-1, Instrument "WARRANTY:"

Change "WARRANTY:" to read WARRANTY: Instrument, 1 year; optional battery, 1 year.